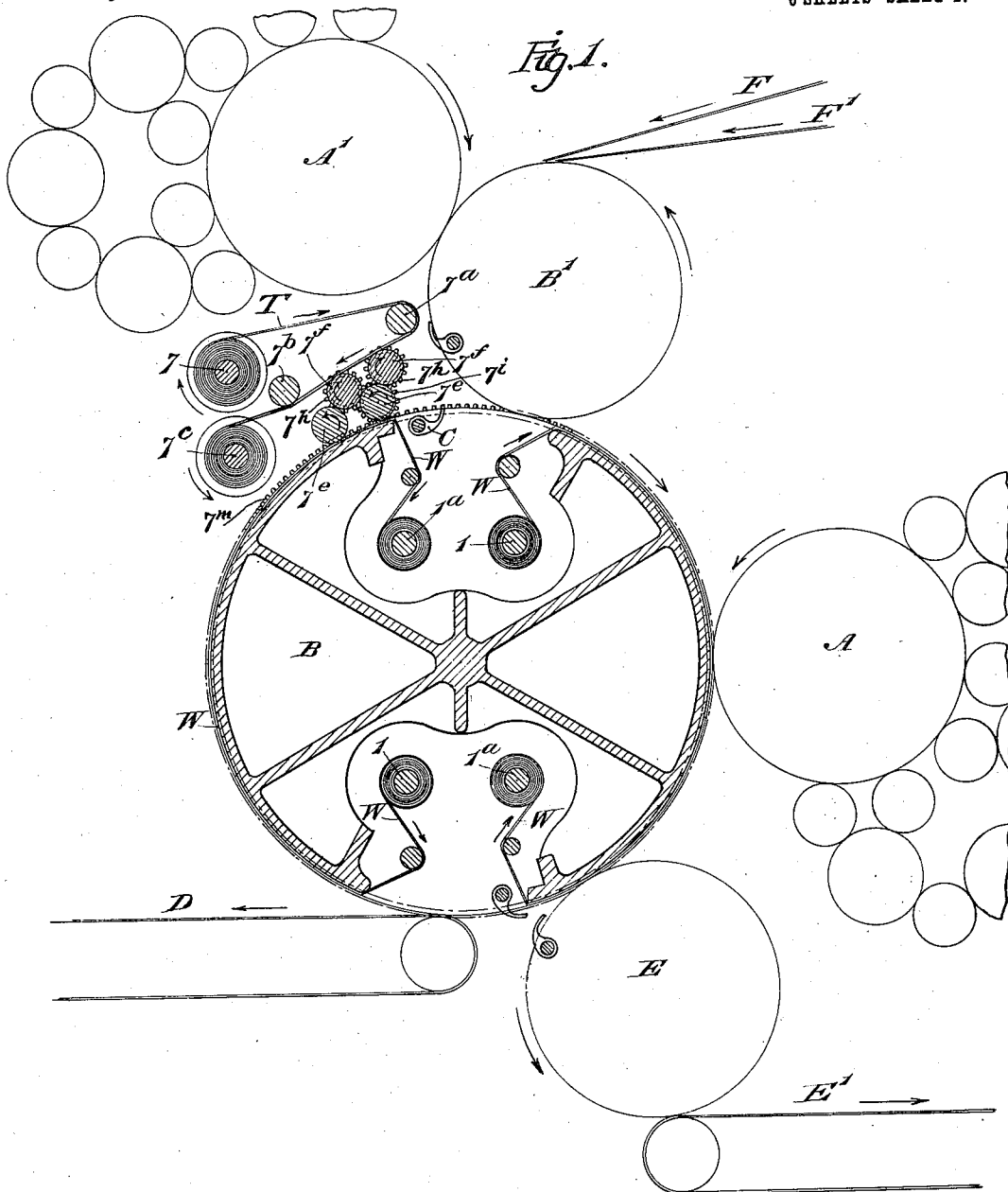


966,533.

6 SHEETS--SHEET 1.



James T. Snowfield
L. E. Witham.

Michael A. Droitcour

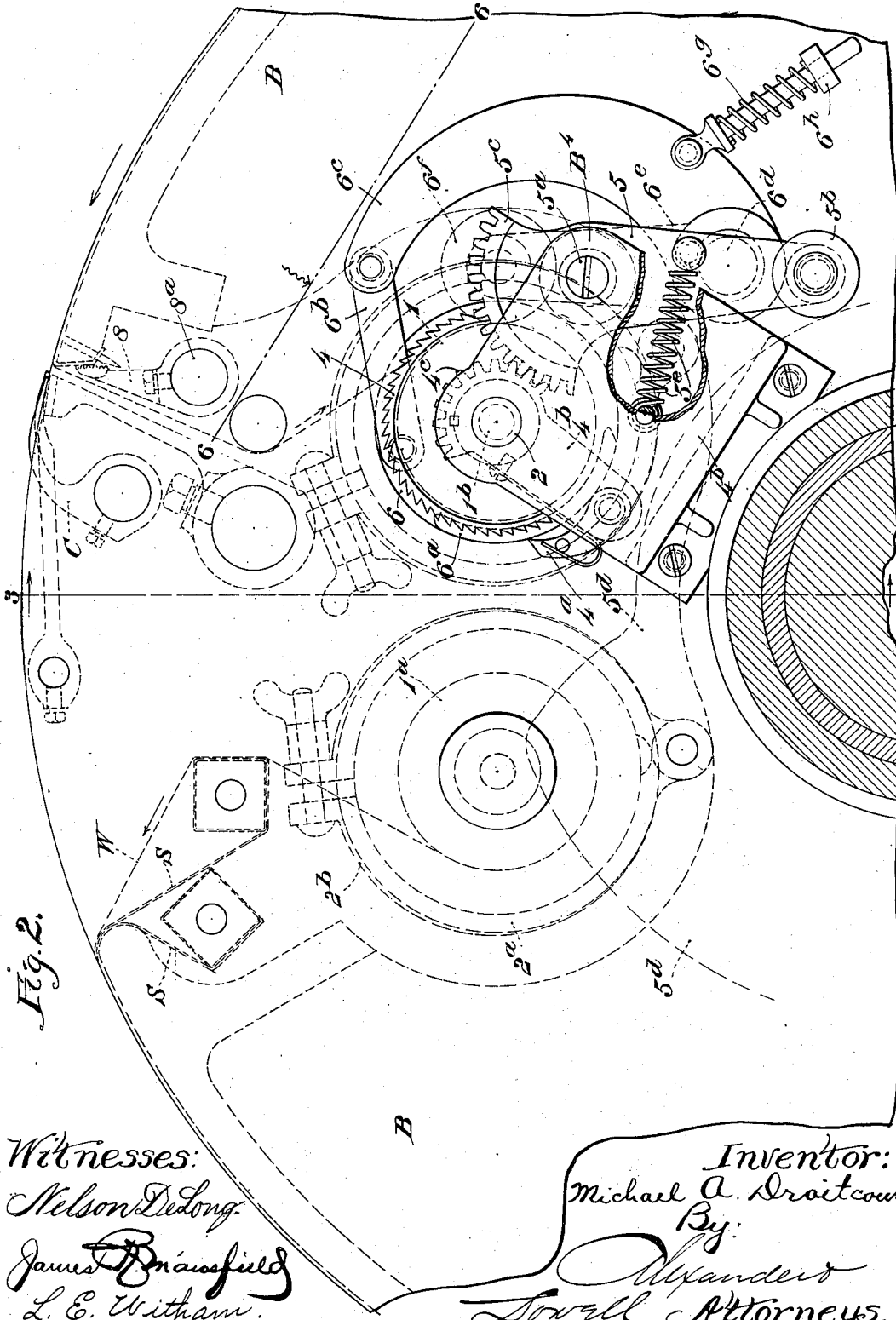
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 TYMPAN MECHANISM FOR PRINTING PRESSES.
 APPLICATION FILED AUG. 5, 1909.

966,533.

Patented Aug. 9, 1910.

6 SHEETS—SHEET 2.



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6 SHEETS—SHEET 3.

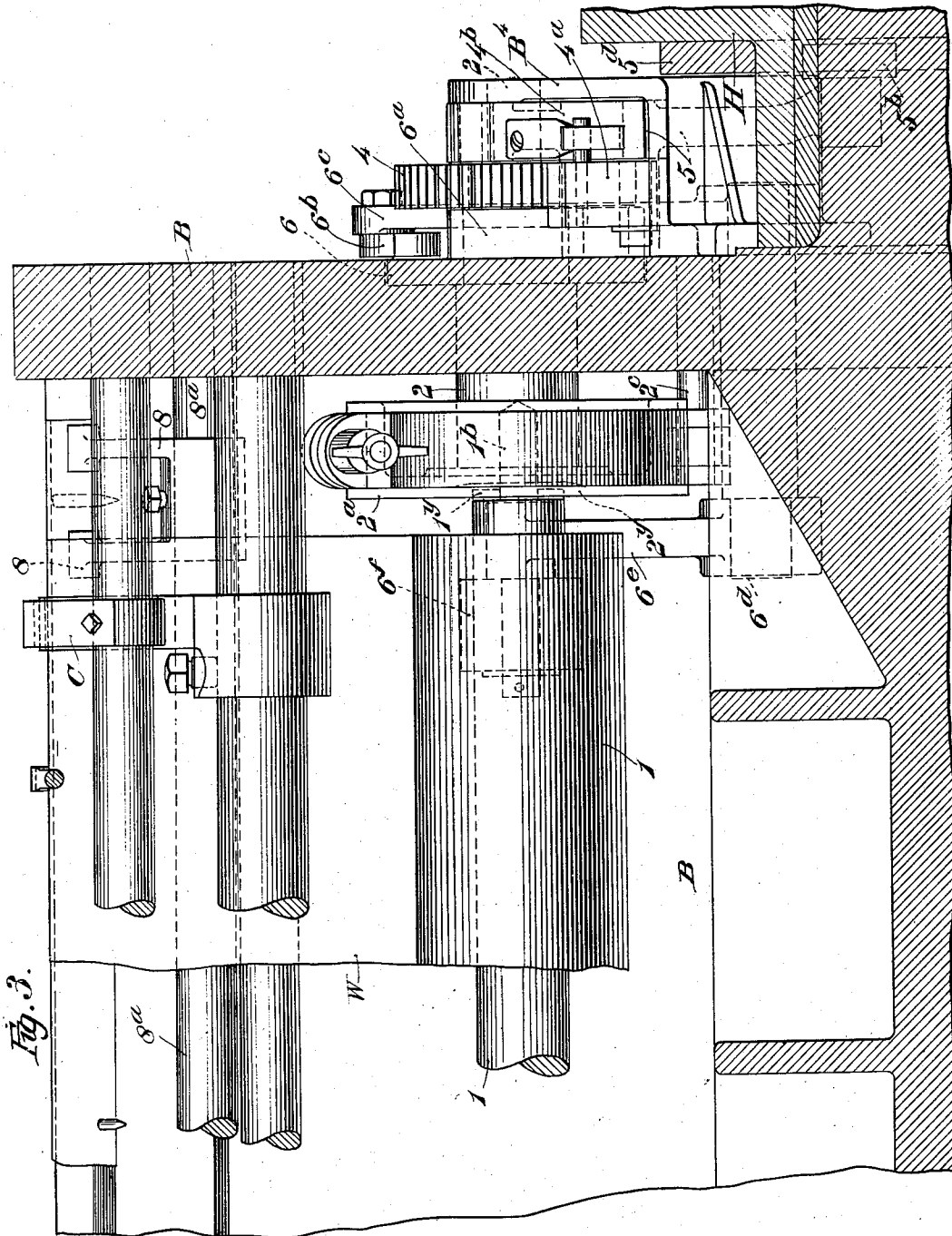


Fig. 3.

Witnesses

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6 SHEETS—SHEET 4.

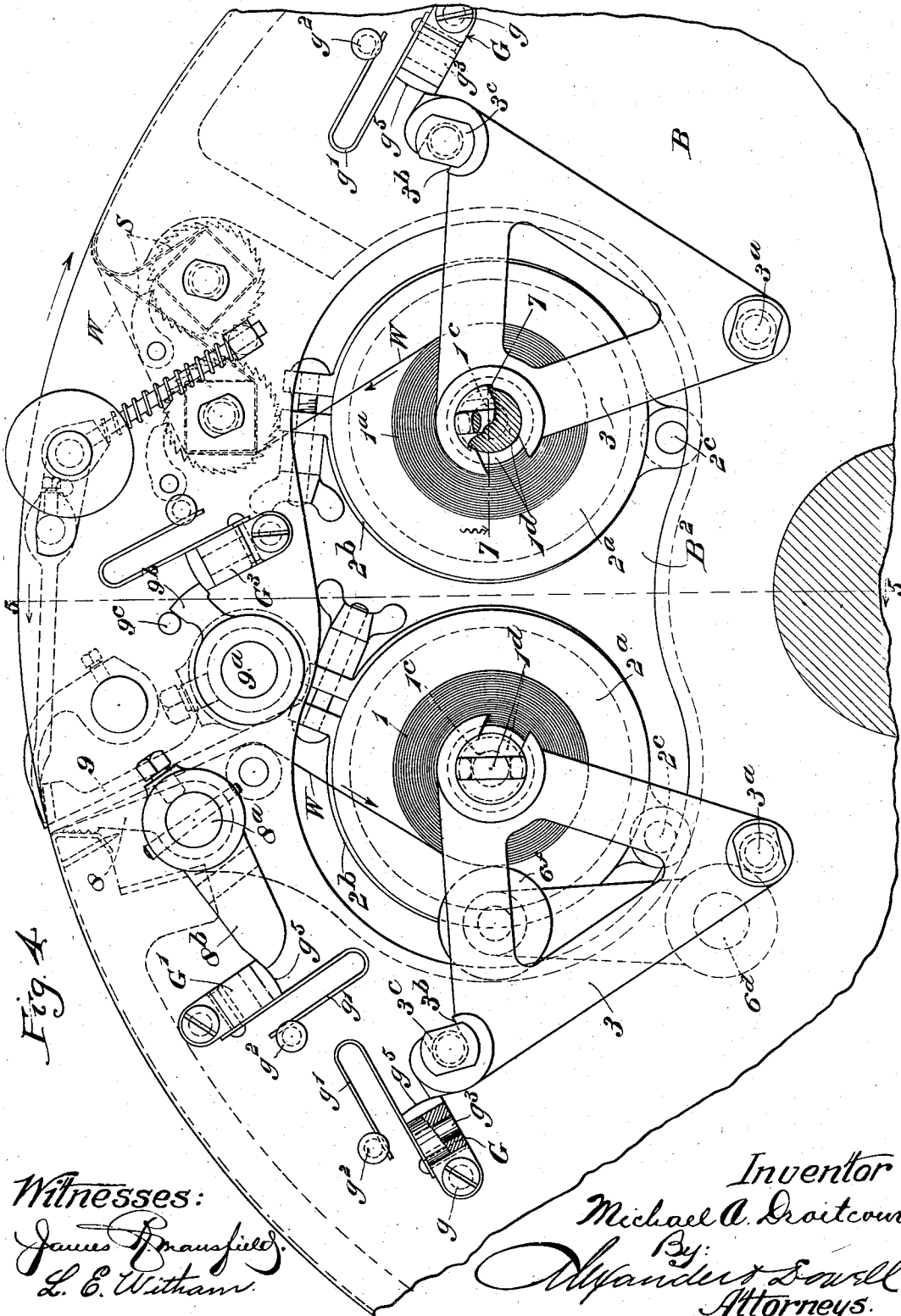


Fig. 4

Witnesses:

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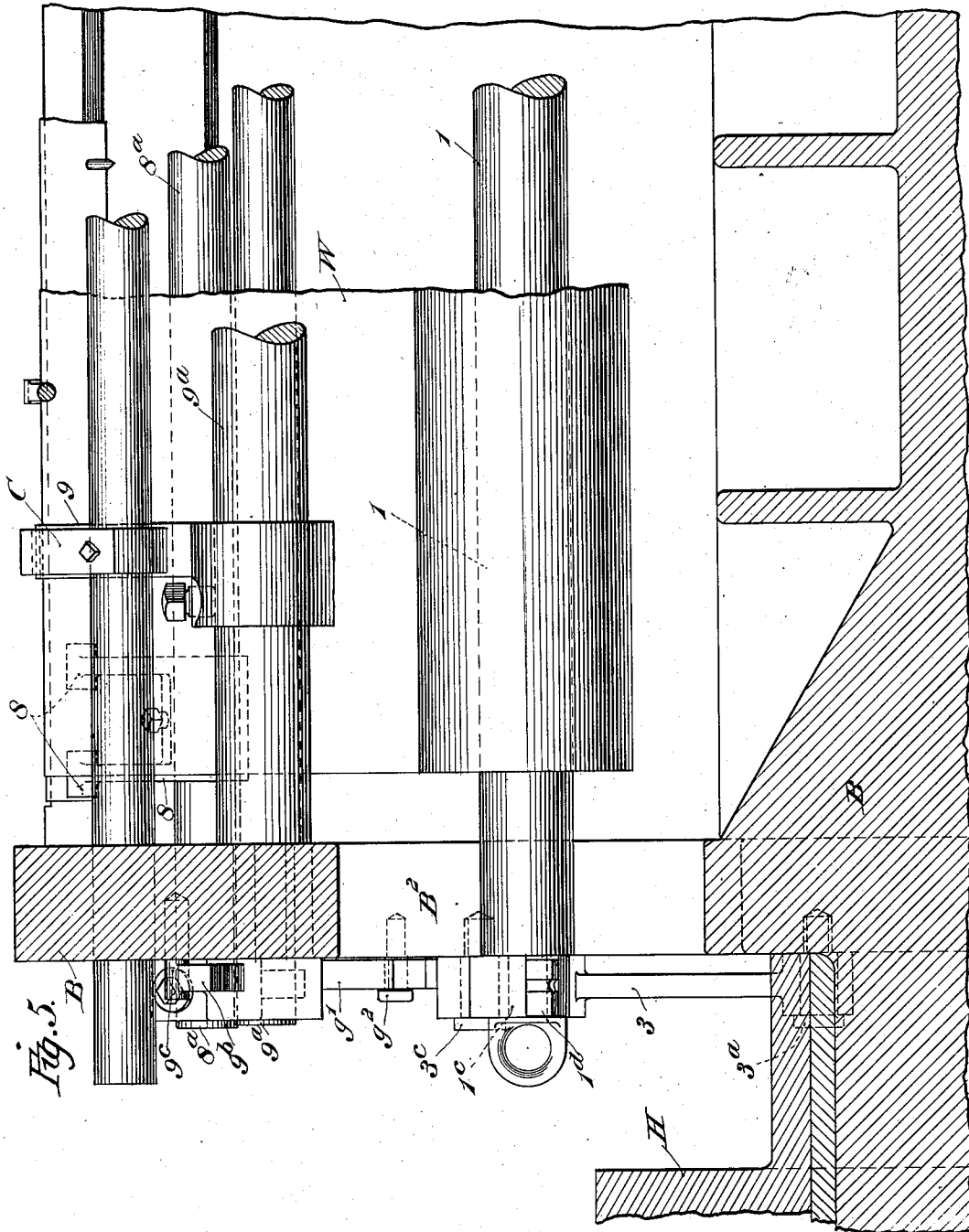
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6 SHEETS—SHEET 5.



Witnesses:

James T. Mansfield
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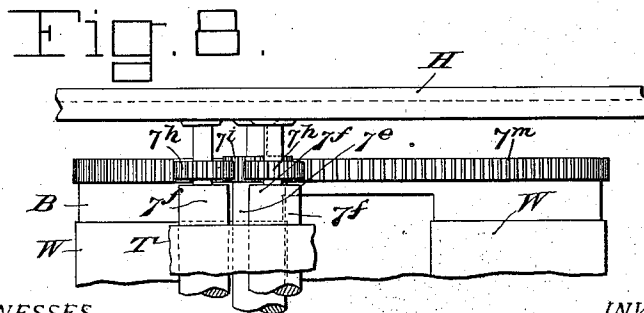
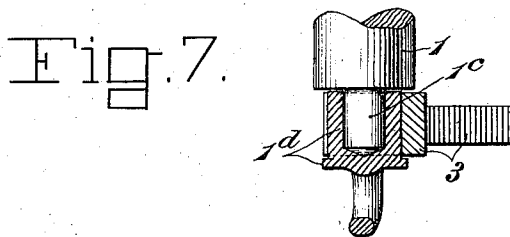
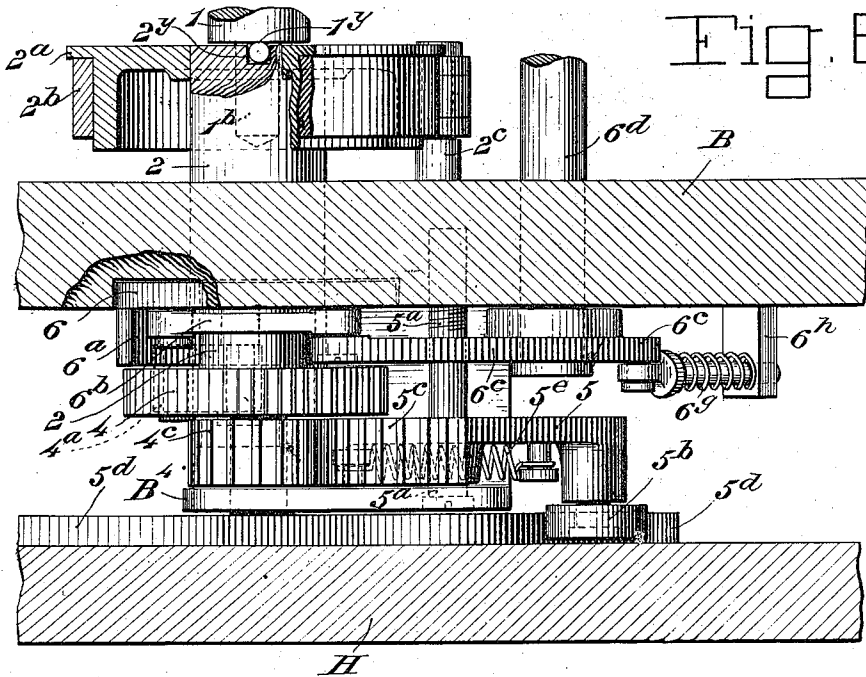
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 TYMPAN MECHANISM FOR PRINTING PRESSES.
 APPLICATION FILED AUG. 5, 1909.

966,533.

Patented Aug. 9, 1910.

6 SHEETS—SHEET 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

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TYMPAN MECHANISM FOR PRINTING-PRESSES.

966,533.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed August 5, 1909. Serial No. 511,432.

To all whom it may concern:

Be it known that I, MICHAEL A. DROITCOUR, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tympan Mechanism for Printing-Presses; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in tympan mechanisms for printing presses, and is particularly designed for sheet printing presses; and its object is to provide novel means whereby the tympan may be slightly shifted at regular intervals during the operation of the press.

The invention also provides a novel combination of tympan shifting and wiping devices; also novel means whereby the tympan rolls can be readily removed from the impression cylinder; also provides novel locking devices whereby the gripper rests, the stretcher sheets, packings, and tympan roll bearings, can be respectively locked in position when adjusted.

In the accompanying drawings I have illustrated the invention as attached to a rotary cylinder sheet printing press, and will describe the invention with reference to said drawings, premising that the invention is not restricted to the specific form and operation of parts illustrated; and I have summarized in the claims the features, parts and combinations of parts wherein the invention resides and for which protection is desired.

In said drawings:—Figure 1 represents a diagrammatical sectional elevation of the perfecting mechanism of a sheet printing press to which my invention is applied. Fig. 2 is a rear or gear end elevation of the cylinder showing the tympan shifting devices. Fig. 3 is a vertical detail section on line 3—3, Fig. 2. Fig. 4 is a front or feeder end elevation of part of the cylinder. Fig. 5 is a vertical section on line 5—5, Fig. 4. Fig. 6 is a detail section on the line 6—6, Fig. 2. Fig. 7 is a sectional view on the line 7—7, Fig. 4; and Fig. 8 is a detail view of the gearing for operating the wiper rolls.

In the drawings A, A', represent plate cylinders, which coöperate with impression

cylinders B, B'. The sheet is first printed by the cylinders A', B', and then perfected by the cylinders A and B. The cylinder B is preferably made of sufficiently large diameter to carry two sheets and is provided with two sets of sheet grippers C; and with two shifting tympan webs W each of which extends approximately over one-half of the cylinder and its ends are wrapped on shafts 1, 1^a, journaled within and at approximately diametrically opposite points of the cylinder.

The sheets can be fed in succession to cylinder B' which is adapted to receive the sheets alternately from feed boards F, F'; and the sheets can be delivered from the cylinder B to tapes D, or to a delivery cylinder E by which they are delivered to tapes E', the parts being preferably so arranged that the sheets fed from board F can be delivered by cylinder E and tapes E' to one table (not shown); and the sheets fed from board F' can be delivered by tapes D to another table (not shown.) This however forms no part of the present invention.

The two sets of shifting tympan mechanism in the cylinder B are constructed and operated alike, therefore the description of one will explain both; similar parts being similarly lettered in the drawings.

One end of the roll 1 on which the tympan W is wound is provided with a stud 1^b which is adapted to engage a socket in the inner end of a rotatable stub-shaft 2 journaled in one end of the cylinder B, see Figs. 2 and 3. The roll 1 can be locked to rotate with stub-shaft 2 by means of a pin 1^c transfixing stud 1^b and engaging a transverse groove 2^c in the end of stub-shaft 2, see Fig. 6. The roll may be detachably but not rotatably connected with the stub-shaft in any other desirable manner. On the other end of the shaft of roll 1 is a trunnion 1^c, which is journaled in a bushing 1^a removably mounted in one arm of a triangular bracket 3 which is pivoted at its lower angle on a pin 3^a, on the adjacent head of the cylinder B; and in the other angle of the bracket is a slot 3^b adapted to be engaged with a pin 3^c on the head of the cylinder B. The bracket can be locked in engagement with the pin 3^c by means of a novel lock which

comprises a short plate G pivotally mounted on a pin g attached to the end of the cylinder adjacent the pin 3^c , and adapted to be swung toward, and be held in engagement with, the side of the bracket 3 by means of a spring g' attached to the plate and bearing against a pin g^2 attached to the head of the cylinder, see Fig. 4. The free end of the locking plate G is rounded or cam-faced as shown at g^5 so that it will wedge tightly against the object with which it is engaged and will hold the latter securely in place and compensate itself for any slight inequalities of adjustment or thickness of parts.

The plate is provided with an aperture g^3 in which a pointed tool or rod can be inserted so as to give a leverage on the plate and enable it to be disengaged from the bracket 3 and allow the latter to be swung clear of the end of the roll 1, the bushing 1^a being first disengaged from the bracket, and then the tympan roll or shaft 1 can be withdrawn endwise from the cylinder B through an opening B^2 in the cylinder head, shown in Figs. 4 and 5.

The rolls 1^a may be mounted similarly to the rolls 1, so that any of the rolls can be removed and replaced through the openings B^2 in the head of the cylinder.

The trunnion 1^b is detachably engaged with the rotatable stub-shaft 2 so as to permit the rolls 1 to be removed from or entered into the cylinder as described. Stub-shaft 2 has a friction disk 2^a fixed on its inner end and engaged by friction straps 2^b , attached to pin 2^c fast to the cylinder head so that the desired friction can be placed on the disk and stub-shaft sufficient to prevent the tympan roll moving by momentum.

Slight intermittent movements are imparted to the stub-shaft 2 and the tympan roll by the following devices, (see particularly Figs. 2, 3 and 6). The stub-shaft 2 is extended slightly beyond the head of the cylinder B and its outer end is journaled in a bracket B^4 attached to the head of the cylinder as shown. On the stub-shaft between the bracket and cylinder head is keyed a ratchet 4 which is adapted to be engaged by a dog 4^a , pivoted on the end of a lever 4^b loosely hung on the reduced end of the stub-shaft 2, and having a toothed segmental end 4^c which meshes with a segment 5^c on the upper end of a lever 5 pivoted on a pin 5^a engaging the cylinder head and bracket B^4 , see Fig. 6. The lever 5 has a cam roller 5^b on its lower end adapted to engage a cam 5^d , which is rigidly attached to the frame H of the press, around the journal bearing of the cylinder, as indicated in Figs. 2, 3 and 6, so that for each rotation of the cylinder the lever 5 will be oscillated, and will operate lever 4^b and cause dog 4^a to move ratchet 4, and consequently roll 1, a predetermined extent of revolution. The cam 5^d may be a race

cam, or a face cam as shown, and roller 5^b is held in engagement therewith by a suitable spring, as indicated at 5^e , Figs. 2 and 6.

In order to determine and regulate the extent of movement imparted to the tympan roll during each rotation of the cylinder B, I provide novel means for automatically varying the time of operative engagement of the dog 4^a with the ratchet 4, as follows: On the stub-shaft 2 beside the disk 4 I place a loose disk 6 which has a parti-cylindric flange or trip portion 6^a equal in length to the full stroke of the dog 4^a ; the tooth of the dog 4^a engages and bears upon this trip portion 6^a when the dog is retracted, see Fig. 2, and while in engagement with this trip or drag portion 6^a the dog is held out of engagement with the ratchet 4. By shifting the disk 6 so as to advance or recede this trip or drag portion in relation to the dog, the extent of operative engagement of the dog 4^a with the ratchet 4 can be varied, and consequently the extent of rotation imparted to the tympan roll 2 from cam 5^d will depend upon the position of this trip 6^a . The trip 6^a is automatically shifted and positioned according to the diameter of the tympan roll on the shaft 1 as follows: To the disk 6 is pivotally connected one end of a link 6^b the other end of which is pivotally connected to the outer end of an arm 6^c fast to a rock-shaft 6^d journaled in the cylinder head; and on the inner end of this rock-shaft 6^d is attached an arm 6^e carrying a roller 6^f , which is normally held in contact with the tympan web on the roll 1 by suitable means as by a spring 6^g interposed between arm 6^e and a stud 6^h on the cylinder head, see Fig. 2. By this means it will be seen that for each rotation of the cylinder B each tympan web therein will be shifted from roll 1^a to roll 1, and the extent of the shifting movement is predetermined by the throw imparted to the dog 4^a and the position of the trip drag 6^a .

At the beginning of the shifting operation when roll 1 is practically empty the roller 6^f can swing in toward the roll 1 and through the described connections will shift the trip 6^a so that dog 4^a engages cam 4 during the entire forward stroke of the dog; as the tympan accumulates on roll 1 the roller 6^f is forced away from the roll 1 and through the described connections shifts trip 6^a so as to gradually prolong the drag of the dog thereon, and shorten the effective time of engagement of the dog with the cam; and the time of engagement of the dog with the cams shortens proportionately to the increase of tympan web on roll 1; in this way the shifting of the tympan is made practically uniform at all times, whether there be little or much tympan on the roll 1.

While in the drawings I have shown cylinder B as adapted to cooperate with two

plate cylinders, and as carrying two tympan webs, it should be understood that the invention—so far as shifting the tympan is concerned—is applicable to a smaller cylinder; or only one tympan might be used instead of two where the cylinder is to print but one sheet during each rotation.

When all the web has been shifted from roll 1^a to roll 1 the rolls may be interchanged in a well understood manner and the web unwound from the full roll as before.

The tympan web is used to prevent offset, as is well known, and in order to lessen the necessity of shifting the web rapidly, and at the same time keep it in effective operative condition, I may employ in connection therewith a wiping tympan T, see Fig. 1. This tympan runs from a roll 7 over a guide 7^a and under a guide 7^b back to a take-up roll 7^c; which rolls 7 and 7^c may be operated by a shifting mechanism such as described for rolls 1, the lever 5 in such case being operated from a rotatable cam or other convenient part of the machine; but any suitable devices may be used for shifting the wiping tympan from one roll to the other, many such being commonly known in the art.

Intermediate the tympan T and the cylinder B, and preferably located to contact with the periphery of this cylinder in advance of the cylinder D, are transfer rollers 7^e, which are of suitable composition to remove ink from the surface of the tympan web W, said rollers rotating with the tympan web W and being driven by frictional contact therewith and with rollers 7^f. Contacting with the transfer rollers 7^e are wiper rollers 7^g, which also contact with the wiper tympan T, and are adapted to remove ink from the periphery of rolls 7^e and deliver it to the tympan T. The wiper rolls 7^g may be driven by gears 7^h, from a gear 7ⁱ on one roll 7^e meshing with a gear 7^m on the shaft of cylinder B, as indicated in Figs. 1 and 8.

By the means described it will be seen that offset and smutting is prevented, first by periodically shifting the tympan W; second by cleaning the tympan W by the wiper web T and rolls 7^e. By using the wiper web it is not necessary to shift the tympan W rapidly and the press can be run a much greater number of impressions before it becomes necessary to change the tympan than would be possible if the wiper web was not used.

As above stated the sheet is first printed on one side between the plate cylinder A' and the impression cylinder B'; it is then transferred from cylinder B' to cylinder B and printed a second time between cylinders B and A. The sheet is taken practically at the top of cylinder B and is delivered at the lower edge thereof. Of course the tympan

web W must not be shifted while the sheet is in contact therewith and therefore the parts are so arranged that the lever 5 will only be operated to shift the tympan W while it is on the ascending side of the cylinder B. The wiper rolls 7^e running with the tympan do not interfere with the shifting thereof and the amount of shift required is so small that there is no danger of rupturing the tympan because of the quick action required in shifting the same by reason of the short space of time permitted for such action when the press is operating at high speed.

The cylinder B can be provided with the usual draw sheets S as indicated in the drawings, see particularly Figs. 2 and 4. These need not be specifically described herein.

The locking devices G can be very advantageously employed for locking the packing clamps, and the gripper rest plates. As indicated in the drawings, Fig. 4, the packing clamps 8 are mounted on a shaft 8^a, as usual, and this shaft is provided with an arm 8^b that is engaged by a lock G' which is constructed like the lock G above described and needs no more detailed explanation. When lock G' is in engagement with the arm 8^b the packing clamps are securely closed against the packing as indicated in Fig. 4. By reason of the cam face *g*⁵ the lock will securely fasten the clamps and permit different thicknesses of packings to be used and securely fasten same without any mechanical readjustment of parts, the cam surface *g*⁵ automatically compensating for variations in thickness of the packings.

Gripper rests 9, of usual construction, are mounted on a shaft 9^a, as usual; but in place of the complicated devices heretofore used for locking the gripper rests in position I provide shaft 9^a with an arm 9^b which abuts against a stop 9^c on the cylinder head, see Fig. 4, when the gripper rests are in operative position, and arm 9^b is engaged and locked in this position by a lock G³ similar to the lock G above described.

In my construction the tympan W is preferably shifted for each impression but only to a slight extent. This prevents the formation of any deep pockets or indentations from the type surface in the tympan web and enables the web to be thoroughly wiped and cleaned by the wiper rollers; and by wiping the tympan web W, I practically have an always clean impression surface so that there will be absolute uniformity in the printed product and there will be no offset or smut on the perfected sheet.

Having described my invention what I claim as new and desire to secure by Letters Patent thereon is:

1. In a printing press the combination of

an impression cylinder, a tympan thereon, means for slightly shifting said tympan after each impression, and means for wiping the shifting tympan after each impression.

2. In a printing press the combination of an impression cylinder, a shifting tympan thereon, a wiper tympan, and means for transferring ink from the shifting tympan to the wiper tympan.

3. In a printing press the combination of plate and impression cylinders, a tympan on the impression cylinder, means for shifting the tympan during the rotation of the cylinder, wiper rolls cooperating with the tympan, and means for removing ink from the wiper rolls.

4. In a printing press the combination of plate and impression cylinders, a shifting tympan on the impression cylinder, means for slightly shifting the tympan during each rotation of the cylinder, a wiper tympan for removing ink from the shifting tympan, and wiper rolls for transferring ink from the shifting tympan to the wiper tympan.

5. In combination an impression cylinder, a tympan web thereon, and rolls for said web; with means for intermittently shifting said tympan, comprising a ratchet connected with one of the roll shafts, a swinging lever, a dog thereon engaging said ratchet, a toothed segment engaging said lever, and a cam for operating said segment during the rotation of the cylinder, and means for varying the extent of engagement of the dog and ratchet according to the size of the tympan roll.

6. In combination a tympan web, and rolls for said web; with means for intermittently shifting said tympan comprising a ratchet connected with one of the roll shafts, a swinging lever, a dog thereon engaging said ratchet, a cam for operating said lever; a shiftable trip beside said ratchet for regulating the extent of engagement of the dog therewith, and means for automatically shifting said trip in accordance with the increase of the web on the roll.

7. In combination an impression cylinder, a tympan web thereon, and means for intermittently shifting said tympan comprising a ratchet connected with one of the roll shafts; a dog thereon engaging said ratchet, means for operating said dog during the rotation of the cylinder; a shiftable trip beside said ratchet for regulating the extent of engagement of the dog therewith, and means for automatically shifting said trip in accordance with the increase of the web on the roll.

8. In combination a tympan web roll, and means for periodically shifting said web roll; with a shiftable trip for regulating the extent of shift of the roll, and means for au-

tomatically shifting said trip by and in accordance with the increase of the web on the roll.

9. In combination a tympan web, rolls therefor, and a pawl and ratchet for periodically shifting one of said rolls to wind the web thereon; with a shiftable trip for regulating the time and extent of engagement of the pawl with the ratchet, and means for automatically shifting said trip in accordance with the increase of web on the winding roll.

10. In combination tympan web supporting rolls, and means for intermittently shifting said tympan, comprising a ratchet for operating one of the roll shafts, a movable dog engaging said ratchet, a shiftable trip for determining the time and extent of engagement of the pawl with the ratchet, and means for automatically shifting said trip in accordance with the increase of web on the roll.

11. In combination, a tympan web, rolls for said web, and means for intermittently shifting said rolls comprising a ratchet connected with one of the roll shafts, a swinging lever, a dog thereon engaging said ratchet, and means for operating said lever; with a shiftable trip beside said ratchet for regulating the extent of engagement of the dog therewith, and means for automatically shifting said trip in accordance with the increase of the web on the roll.

12. In combination, a tympan web winding roll, a stub-shaft to which one end of the tympan winding roll is detachably attached, a ratchet on the stub-shaft, a movable dog engaging said ratchet, a trip for determining the extent of engagement of the pawl with the ratchet, and means for automatically shifting said trip in accordance with the increase of web on the roll.

13. In combination, a tympan web, rolls for said web, a stub-shaft to which the web winding roll is detachably connected, a ratchet connected with the stub-shaft, a swinging lever, a dog thereon engaging said ratchet, and means for operating said lever; with a shiftable dog trip beside said ratchet, and means for automatically shifting said trip in accordance with the increase of the web on the roll.

14. In combination, a tympan roll shaft, and means for intermittently operating said shaft comprising a ratchet, an oscillating lever having a toothed segment on one end, and a pawl on its other end adapted to engage the segment, an oscillating lever pivoted beside the first lever and having a segmental end meshing with the segmental end of the other lever; means for oscillating the second lever at regular intervals, and a trip beside the segment.

15. In combination, a tympan roll shaft, means for intermittently operating said shaft comprising a ratchet, an oscillating

lever having a pawl adapted to engage the ratchet, and means for oscillating the lever at regular intervals; with a pawl trip beside the ratchet adapted to delay engagement of the pawl therewith, a device adapted to bear against the tympan on the roll, and connections between said device and said trip whereby the position of the latter is regulated by the amount of tympan on the roll.

16. In combination, a tympan winding roll shaft, and means for intermittently operating said shaft comprising a ratchet, an oscillating lever having a toothed segment on one end, and a pawl on its other end adapted to engage the segment, an oscillating lever pivoted beside the first lever and having a segmental end meshing with the segmental end of the other lever, and means for oscillating the second lever at regular intervals; with a pawl trip beside the ratchet adapted to delay engagement of the pawl therewith, a rock-shaft, an arm on said shaft carrying a roller adapted to bear against the periphery of the tympan roll or tympan on the roll, and connections between said shaft and said trip whereby the position of the latter is regulated by the amount of tympan on the roll.

17. In combination, a stub-shaft, a friction disk on the end thereof, a tympan roll detachably connected with said stub-shaft, a ratchet on the said shaft, a disk loosely mounted on the shaft beside the ratchet and having a pawl trip, a lever hung on the shaft carrying a dog adapted to engage the ratchet when permitted by said trip, and means for operating said lever.

18. In combination, a stub-shaft, a friction disk on the end thereof, a tympan roll detachably connected with said stub-shaft, a ratchet on the said shaft, a disk loosely mounted on the shaft beside the ratchet and having a pawl trip, a lever hung on the shaft carrying a dog adapted to engage the ratchet when permitted by said trip, and means for operating said lever; with means regulated by the amount of web on the roll for shifting said trip so as to shorten the amount of throw of the ratchet as the tympan accumulates on the roll.

19. In combination, a tympan roll, a friction disk at the end thereof, a ratchet for turning said shaft, a disk loosely mounted beside the ratchet and having a pawl trip, a lever having a segmental end and carrying a dog adapted to engage the ratchet when permitted by said trip, a second lever pivoted beside the first lever and having a segmental end engaging the segmental end of the first lever, and means for oscillating said second lever; with a rock-shaft, an arm on said shaft carrying a roller adapted to bear against the tympan on the roll, a second arm on said lever and a link connecting

said arm with said disk, whereby the trip is shifted as the tympan accumulates on the roll.

20. In combination, a stub-shaft, a friction disk on the end thereof, a tympan roll detachably connected with said stub-shaft, a ratchet on the said shaft, a disk loosely mounted on the shaft beside the ratchet and having a pawl trip, a lever hung on the shaft and having a segmental end, a dog on said lever adapted to engage the ratchet when permitted by said trip, a second lever pivoted beside the first lever and having a segmental end engaging the segment on the first lever, and means for oscillating said second lever; with means regulated by the amount of web on the roll for shifting said trip so as to shorten the amount of throw of the ratchet as the tympan accumulates on the roll.

21. In a printing press, the combination of a tympan roll, a pivoted bracket supporting said roll journal, a lock for said bracket comprising a pivoted plate having a cam face adapted to engage and wedge against the bracket and a spring for normally holding said plate in engagement with the bracket.

22. A locking device for the purpose specified comprising a pivoted plate having a cam face adapted to engage and wedge against the object to be locked, a pin pivoting said plate to its support, and a spring connected with said plate for holding it in locking position.

23. A locking device for the purpose specified comprising a plate pivoted at one end and having a rounded cam surface on its free end adapted to engage and wedge against the object to be locked, and a spring connected with said plate and adapted to hold it yieldingly in locking position.

24. A locking device for the purpose specified, comprising a plate pivoted at one end and having a wedge or cam face on its outer end adapted to engage and wedge against the object to be locked, and having a hole for engagement of a releasing tool, and a spring connected with said plate for holding it yieldingly in engagement with the object to be locked.

25. In a printing press the combination of an impression cylinder, a tympan thereon, means for slightly shifting said tympan on the cylinder intermediate the taking of impressions, and means for removing the offset ink from said tympan after each impression.

26. In a printing press the combination of an impression cylinder, a tympan thereon, means for intermittently shifting said tympan; with a wiper tympan beside the cylinder, means for shifting the wiper tympan, and means for transferring offset ink from the cylinder tympan to the wiper tympan.

27. In a printing press the combination of plate and impression cylinders, a tympan on

the impression cylinder and means for intermittently shifting said tympan during the rotation of the cylinder; with wiper rolls beside the cylinder for removing offset
5 ink from the tympan, and means for removing the ink from said wiper rolls.

28. In a printing press the combination of plate and impression cylinders, a shifting
10 tympan on the impression cylinder, and means for slightly shifting said tympan during each rotation of the cylinder; with

a wiper tympan beside the cylinder and wiper rolls contacting both tympan and adapted to transfer offset ink from the shifting tympan to the wiper tympan.

In testimony that I claim the foregoing as
my own, I affix my signature in presence of
two witnesses. 15

MICHAEL A. DROITCOUR.

Witnesses:

JAMES R. MANSFIELD,
L. E. WITHAM.